### 4. Diagnostics for best model

##### Equation for final model

$$y =β\_{1}P\_{1}+β\_{2}P\_{2}+β\_{3}P\_{3}+β\_{4}P\_{4}+ω\_{GL}\left[\left(P\_{1}+P\_{2}\right)\left(P\_{3}+P\_{4}\right)\right]+ω\_{G}\left(P\_{1}P\_{2}\right)+ω\_{L}\left(P\_{3}P\_{4}\right)+$$

$$β\_{1}^{'}P\_{1}X\_{N} +β\_{2}^{'}P\_{2}X\_{N}+ω\_{GL}^{'}\left[\left(P\_{1}+P\_{2}\right)\left(P\_{3}+P\_{4}\right)\right]X\_{N} +ϵ $$

##### Model assumptions

There are four main assumptions in regression models

1. The residuals ($ϵ\_{i}$’s) are iid (independent and identically distributed), i.e., $Cov\left(ϵ\_{i},ϵ\_{j}\right)=0;∀i\ne j$.
2. The residuals are normally distributed.
3. The residuals have a mean of 0, i.e., $E\left[ϵ\right]=0$, alternatively this implies that $E\left[y\right]=Xβ$
4. The residuals are homoscedastic and have constant variance, i.e., $Var\left(ϵ\right)=σ^{2}$

These can summarised in a single statement as follows

$$ϵ∼N\left(0,σ^{2}I\right) \& Cov\left(ϵ\_{i},ϵ\_{j}\right)=0;∀i\ne j$$

##### Assessing model diagnostics

# The model\_diagnostics function from DImodelsVis can be used for assessing the model assumptions for a DImodel
# The model parameter accepts a fitted regression model object
model\_diagnostics(model = mod4)